

# Carbon Rationing Action Groups: An Innovation History



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Community Innovation for Sustainable Energy research team



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## **Carbon Rationing Action Groups**

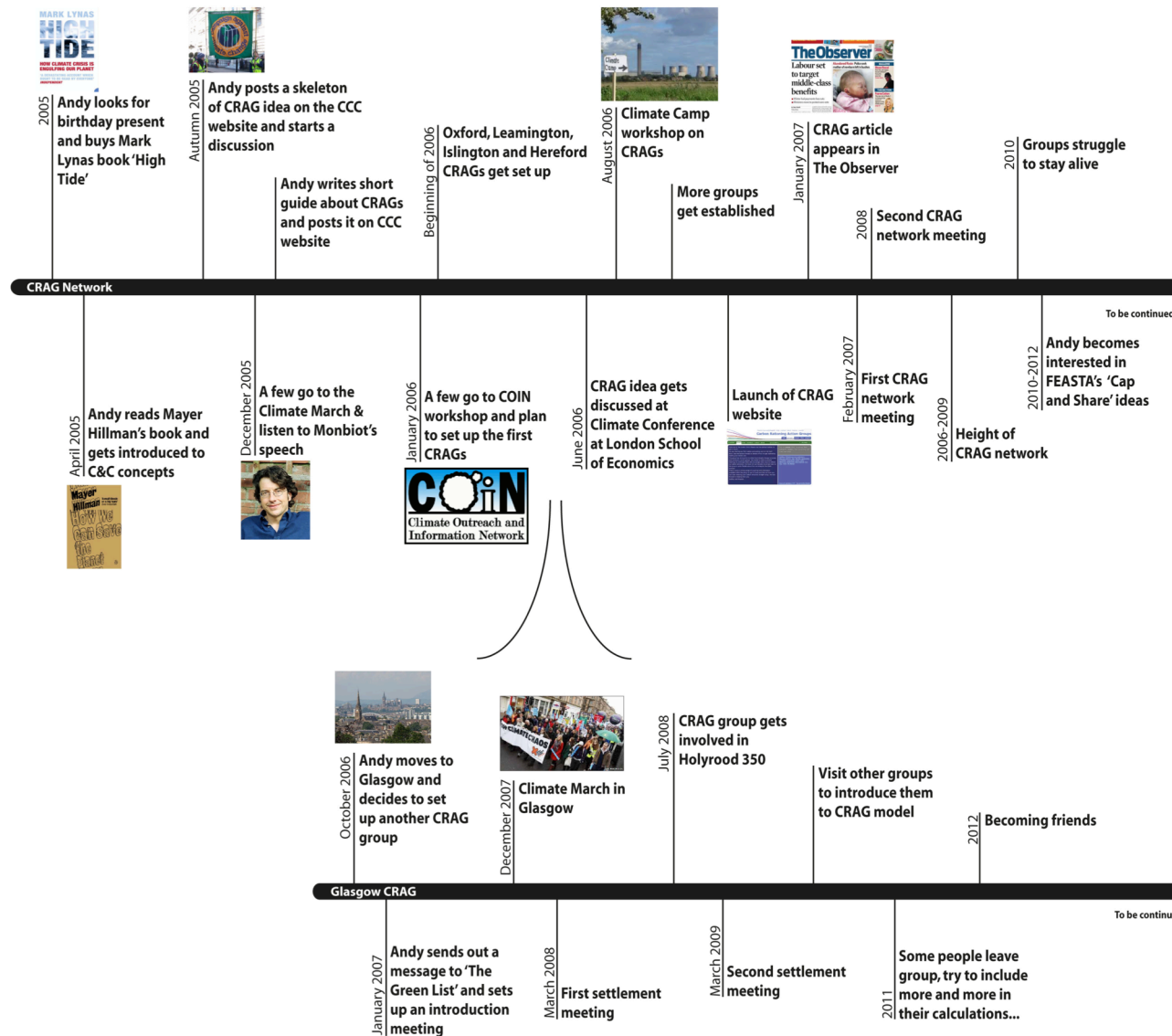
Carbon Rationing Action Groups (CRAGs) are community-based groups who agree to reduce their carbon emissions through the creation of carbon targets. The members of each CRAG decide a carbon target per person at the beginning of the 'carbon year' and the price per kg of carbon. Over the year each member records his/her personal carbon emissions, using the same metrics. At the end of the year, members share their results and people who exceeded the agreed target pay a financial penalty. The penalty money is paid into a bank account and distributed to members who saved carbon as agreed by the participants. The Carbon Rationing Action Groups innovation history traces the origins of the network, through its height when about 25 groups operated across the UK in 2008, to its eventual demise in 2010.

### **Key Insights**

For the Community Innovations for Sustainable Energy (CISE) project, the Carbon Rationing Action Groups are particularly interesting because they are instructive for identifying features that help grassroots initiatives to flourish, as well as aspects that really challenge the maintenance of momentum and depth of growth. In particular, it illustrates that:

- The creation of supportive infrastructures is sometimes more driven by informal group efforts than systematic ones. It is important to remember that community energy groups are often run by volunteers whose aim might not be to systematically spread their efforts. For instance, the network was meant to grow organically.
- For some community energy groups, resources are not the most essential ingredient to help activities spread but rather the development of soft skills, so that groups can create a trustworthy, social and relaxing environment in which CRAG concepts can be explored in everyday life.
- Some community energy groups spread and grow by relying on friendship and family contacts, and self-selection and adaptation amongst pre-existing environmental groups. Such self-selective groups might make it difficult to mainstream some of the ideas developed by the groups, but they help to quickly create a supportive and trustworthy environment.
- Efforts from community energy groups need to be supported by wider structural changes (implemented, for example, by policymakers). Their efforts cannot be considered purely as a policy tool to engage the public in sustainable energy issues. Groups come across structural barriers that cannot be entirely overcome by the groups' willingness to make a difference. They need to develop in a supportive and protective environment to make a real difference.
- Some community energy groups are built on very well defined frameworks with some clear visions. However, sometimes these do not stand the test of time or reach a broad audience. This innovation history highlights the importance of experimenting with approaches to develop visions that are flexible enough that for a range of stakeholders to buy-into them over a long period of time.

## Carbon Rationing Action Groups



Carbon Rationing Action Groups Timeline



## The Community Innovation for Sustainable Energy Research Project

The combined pressures of climate change, peak oil and threats to energy security are increasingly seen as demanding a fundamental transition in the energy system. In this context, there has been a surge of interest and activity in small-scale, sustainable energy projects led by local communities. Examples include insulation clubs, energy awareness and behaviour change networks, and co-operatively-owned small-scale renewable energy systems. Whilst these projects have experimented with a wide range of different sustainable energy solutions, previous research has highlighted the profound challenges community energy projects face in growing, diffusing or even simply surviving. In particular, there is a tendency to treat them as marginal and parallel to mainstream energy systems and, as such, little is known about how or why community energy projects do or do not spread or grow into wider society, nor about their potential influence on wider low-carbon transitions.

The Community Innovation for Sustainable Energy (CISE) research project engages with this gap in knowledge by examining the processes under which community energy projects have spread and grown within the UK. We do this with a view to providing independent advice to policy-makers, community groups and energy businesses about the merits and processes for supporting community energy. To achieve these aims, the CISE project is undertaking a variety of research activities. These activities include working with 12 community energy projects in-depth to explore the key challenges being faced on-the-ground, the extent of networking and learning between projects, and whether this is assisting in the diffusion of community energy.

Inspired by the Institutional Learning and Change Initiative, and by Bath University's 'Lowcarbonworks' project, the individual reports on each of the 12 projects are being presented as 'innovation histories'. Unlike conventional case study reports, innovation histories aim to gather human stories of what happened during project development to provide a multi-voiced account of the innovation process. They encourage key individuals to reflect on their own actions and how they are linked with the actions of others, and making it possible, therefore, for external parties to learn from others' real-life experiences. Rather than privileging the perspective of the researcher, innovation histories are presented in a narrative format that juxtaposes quotes from core participants, the researcher's own reflections on key developments, and wider theoretical insights relating to the innovation and diffusion of community energy. These are based on accounts gathered during in-depth interviews with project members and project meetings and information gained from published materials and the project website. Participant and project anonymity has been respected where requested.



Participant  
quotes



Researcher  
reflections



Participant  
reflections



Theoretical insights

## Carbon Rationing Action Groups: An Innovation History

### Origins: Coming up with the idea

The Carbon Rationing Action Groups' (CRAGs) innovation history begins with its founder, Andy Ross. His entry into the issues of climate change began through a chance encounter with two cyclists on one of his European travels; they persuaded him to take up cycling as a way of commuting to work and he became a keen cyclist in 2005. Whilst looking for a birthday present for his Dad in a bookshop in Greenwich, London, Andy came across a book called 'High Tide' written by the British author, journalist and environmental activist, Mark Lynas. Instead of giving the book to his Dad, Andy read it himself, deepening his understanding about the effects of climate change on people's livelihoods around the world and the patent imbalance between 'polluters' and 'sufferers'. The idea that Western countries need to contract or reduce their carbon emissions whilst developing countries should be allowed to increase theirs until the world converges on a sustainable per capita footprint (between 1-2 tonnes annually) resonated with Andy.

Andy's interest in the topic grew. Mark Lynas' book also introduced him to the approach of 'Contraction and Convergence' (C&C) and signposted the work of Mayer Hillman and Tina Fawcett (who wrote the book 'How we can save the planet'), and Aubrey Meyer (who regularly contributes to the C&C website) which he subsequently explored. According to Andy, Mayer Hillman looked at the possibility of implementing a personal carbon-trading scheme as a national UK policy, which they echo for entire countries on the international stage with the C&C approach. Within a personal carbon-trading scheme every eligible adult would have a 'carbon account', which would be credited with a free carbon allowance at regular intervals. Individuals would need to submit some of the carbon credits whenever they use fossil fuel or electrically-powered products (powered products based on the amount of CO<sub>2</sub> that they emit), providing a potential incentive for individuals to reduce their emissions. Carbon credits would be legally tradable between individuals – people with spare credits could sell them on a regulated market to others who require more than their free allocation.

Andy was intrigued by the scheme Mayer Hillman proposed and was wondering if such an idea could work on a micro scale. In the autumn of 2005, he posted a skeleton of the CRAG model (a micro version of the C&C model) on the Campaign Against Climate Change website. He also sent it to a 'well known' environmentalist. He discouraged Andy from the idea, but a small group of people started to discuss his proposition positively on the website, including John Ackers (who was actively involved in his local Friends of the Earth group), Guy Shrubsole (who was studying at Oxford and now is a Friends of the Earth Energy Campaigner), and David Bassendine (who studied Earth and Environmental Science and now works as a web developer). At the time, Andy had moved from London to the West Midlands and joined Friends of the Earth Warwickshire. A few of them decided to go together to the Climate March in London on 5 December 2005. George Monbiot, a British environmentalist and writer, was giving a speech entitled the 'Riot for Austerity' that day, calling for 90% emissions cuts by 2030 in both energy use and personal consumption. Spurred on by his speech, Andy and a handful of like-minded people decided it was no longer enough just talk about climate change but to actually take action – to start up Carbon Rationing Action Groups.

Andy: "The climate injustice and how to sort of fix that was, for me, a very strong motivator... the social justice was I guess where it touched a chord, you know, the fact that it was an environmental issue, maybe it was almost secondary..."

"C&C is founded on two fundamental principles: first, that global emission of carbon dioxide must be progressively reduced; and second, that global governance must be based on justice and fairness." Mayer Hillman  
**Contraction:** Global CO<sub>2</sub> emissions are reduced towards an internationally-agreed target by an internationally-agreed year.  
**Convergence:** Global convergence to equal per capita shares of this contraction is phased towards the contraction target by an agreed year.

Andy: "And he wrote back and said 'Andy, don't bother, because I've spent the last, how many decades trying to persuade people to reduce their carbon footprint and it's a waste of time' ... I remember being shocked by his statement."

Andy: "I heard Monbiot's speech about us having to be the first generation to 'ask for less rather than more' and to 'Riot for Austerity'. When we drove back we decided we couldn't shout about what to do about climate change if we weren't prepared to do it ourselves."

Andy has mainly provided the narrative of this innovation history (in addition to three other Glasgow CRAG members, the CRAG website and publications about the approach) - if others from the CRAG movement had narrated it, the beginning might have sounded differently. Still, Andy has often been stated as being the 'founder' of the CRAG movement.

The CRAG innovation history really revealed to me that from 2005-2009 there was a real urge for local action against climate change in the UK. This often seemed to have been spurred on by activists who wanted to move on from purely campaigning about the issues, 'failed' international and national climate negotiations, and an increase of public interest in climate change.

Andy got home and started to write up the first short guide about Carbon Rationing Action Groups, outlining how he envisaged the groups would operate, and posted it on the Campaign Against Climate Change website:

Andy: "I had a short paper and I wrote what I thought were the aims... one of them was to explore the value of contraction and convergence as a policy, or personal carbon trading as a policy at a national level, you know."

Andy: "It's basically a do it yourself version of C&C - what Mayer Hillman advocates in Chapter 8 of his book."

**"CARBON RATIONING ACTION SCHEME:** The scheme is based on the concepts of Contraction and Convergence and Domestic Tradeable Quotas. It is basically a do-it-yourself version of what Mayer Hillman advocates in Chapter 8 of his book. The main aims of the scheme are as follows: 1. to make us all aware of our personal CO2 footprint; 2. to find out if it can help us make radical cuts in our personal CO2 emissions; 3. to help us argue for (or against!) the adoption of similar schemes at a national (DTQ) and/or international (C&C) level; 4. to build up solidarity between a growing community of carbon conscious people.

To achieve a 90% reduction in personal emissions by 2030 will require a 10% reduction per year. For the sake of simplicity, the scheme covers the first four categories of personal emissions only that is household electricity, heating, car and air travel. Again for the sake of simplicity, let us assume that these amounted to 5000kg of CO2 in 2005. The personal ration of each member of the scheme will therefore be 4500kg in 2006, 4050kg in 2007, and so on. The scheme works on a carrot and stick basis by rewarding those who live within their ration while penalising those who exceed their ration...

The average UK citizen caused 5.4t (i.e. 5400kg) of CO2 to enter the atmosphere. These were due to: 1. household electricity consumption (0.9t), 2. household heating (1.5t), 3. car use (1.0t i.e. roughly equivalent to 5000km of motoring or about 14 return car journeys between London and Birmingham), 4. air travel (1.8t i.e. roughly equivalent to one return flight to Athens), and 5. bus + train use (0.2t). These 5 categories make up our so-called personal CO2 emissions. Personal CO2 emissions make up about half of the UK's total. The other half is caused by businesses and the public sector. Overall then, the UK per capita figure is about 11t of CO2. A sustainable level is thought to be about 1.2t, i.e. 0.6t of personal CO2 emissions. This represents a 90% reduction from today's level. To avoid dangerous and potentially runaway climate change, this needs to be achieved by 2030.

**HOW IT WORKS:** At the start of the year (i.e. next week!), I will credit your CO2 account with your annual ration (4500kg in 2006). Every time you get an energy bill, a new MOT or a plane ticket, you will let me know the details (e.g. how many kWh of electricity, annual car mileage, flight destination, etc.) and I will debit the equivalent amount of CO2 from your account and let you know your new CO2 balance. This should not mean you sending me more than about 12 to 15 emails a year. At the end of the year, if you are in credit, you have nothing to worry about. In fact, you will stand to gain for every kg of CO2 still in your account! If, on the other hand, you are overdrawn, I will ask you to pay off your CO2 debts! Debts will be paid at a rate of so many pence per kg of CO2. The participants will agree amongst themselves what this rate should be. They must come to an agreement by the end of March each year for 2006... Debtors will pay their dues into a CO2 fund held with a friendly bank (I could try the Co-op?). The CO2 fund will then be distributed amongst the CO2 savers in proportion to their share of total savings. So if, for example, your savings account for say one tenth of all savings made by the group, you will receive one tenth of the total in that year's CO2 fund... At the end of the year, whether you are in credit or overdrawn, if you want to remain in the scheme and/or benefit from the distribution of the CO2 fund from the year just completed, you should send me (as proof of your year's CO2 footprint) paper copies of your energy bills, MOT and plane tickets. These should get to me before the end of January of the New Year. CO2 debts due on the old year should be paid in February of the New Year. CO2 funds will be shared out amongst the happy savers in March.

**ENFORCEMENT:** Failure to provide CO2 footprint proof by the end of January or failure to pay off your CO2 debt by the end of February will result in your exclusion from the scheme. If you opt out of the scheme for some reason one year, you cannot opt back in. This is to prevent people going off for a CO2 binge and then rejoining the next year having got it out the system. Threat of exclusion from the scheme is the only means of enforcement at our disposal. However, it ensures (I think) that CO2 funds are only paid to those who have a clean compliance record." (Andy 2006)

I was impressed by Andy's determination to read everything possible about C&C and think through a detailed guide how such an approach could work on the micro scale. It seems that the CRAG movement had some clear aims, starting on the small scale with the wish to go mainstream and have a wide impact.

After posting the guide on the internet, the Climate Outreach and Information Network (COIN) organised a get together in Oxford in January 2006 for groups and individuals who were interested in taking practical action against climate change. This was when Andy could meet up face-to-face with David and Guy for the first time to discuss his guide in more depth, and plan how they would set up the first CRAGs in Oxford, Leamington, Islington and Hereford in the first half of 2006.

### Institutional infrastructure

Innovation theory stresses that innovation is a process, and not simply the novel object produced at the end. The innovation of CRAGs was a development process, as well as producing a model for groups to adopt. A progress view leads to an emphasis of the networks of individuals and things that generate the process. In this case, as with some of CISE's other innovation histories, individuals play an important role. At first glance, they can appear like inventors of the innovative object. And yet, when considering these dynamics more deeply it is possible to see that these inventors are vital champions for the innovation, but they also relied upon and drew in networks of others to ensure the progress moved along. Andy's ideas drew upon work by Aubrey Meyer and Mayer Hillman, just as they drew upon research into climate issues and solution; and as considered below, Andy drew in others to help turn the ideas into a reality. The COIN meeting in Oxford is an example of just how significant network-building events are. Activities and resources are important for grassroots innovation.

### First CRAGs get establish in the UK

One of the first groups to emerge was the West Midlands CCC Personal Carbon Rationing Scheme (which later become the Leamington Carbon Rationing Action Group in April 2006). Andy and two other Friends of the Earth Warwickshire members initiated the group by sending around a message (with the short guide) to a wider Friends of the Earth email group, asking for people to join. During a discussion online the members debated their possible carbon target for 2006, what emissions they would be able to count and what penalty they would set if people go over their carbon allowance. Andy recommended that people should calculate their emissions from 2005 so that they would have an idea of their baseline emissions in order to agree on a sensible target for the group (not too low or high). At the end, they decided to have a target of 4500kg of CO<sub>2</sub> per person (ten per cent below the UK personal average of 5 tonnes) for their first year, with a 4p per kilogram penalty for over-emitters. The West Midlands CRAG consisted of eight people who regularly met up in Leamington, one of the easiest places to congregate for all of the members in the Midlands.

After the first year Andy was three tonnes over the target and had to pay a fine of £120. Andy: "I lived for most of that time in a huge draughty house fuelled by two Agas. Despite living with three other people and not flying for leisure at all, it came to that."

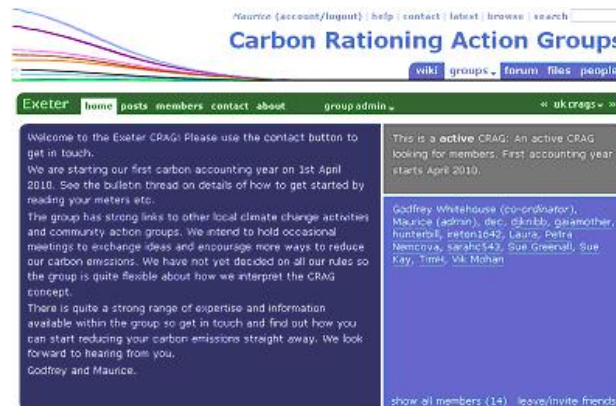
The subsequent CRAGs were set up in Oxford and Islington. Starting in May 2006, one of the other earlier CRAGs was established by Andy's sister in Hereford. The core members of the group already knew each other through other environmental groups. Initially around eighteen people showed an interest in joining the group; over a few months this reduced to a core group of twelve. The group has found this to be just the right number of people to effectively run the CRAG, encouraging interested people to set up their own rather than add to existing group. After some discussions the members decided to have a carbon target of 4500kg in their first year. Unlike other groups, the Hereford CRAG decided to apply no financial penalties to members who exceeded the target.

Andy: "There's a sort of financial element which CRAGs we're exploring (and which was distasteful I think to certain types of environmentalists) and even people within the CRAG groups themselves didn't like that and ditched that idea from the start."

Andy: "We didn't constitute ourselves... So each group was left to make its own decisions on every point at the end of the day. At no point was any CRAG expelled because they weren't doing it a certain way... There was no institutional motivation to kind of come up with the final set of criteria or rules or advice or whatever, it all emerged out of discussions."

A debate about CRAGs during the Climate Conference at the London School of Economics in June 2006, and a workshop at the first Climate Camp in Yorkshire (outside the Drax coal-fire power station) in August, contributed to the acceleration of CRAGs in the second half of 2006. Although several of the CRAG ideas clashed with beliefs shared some of the Climate Camp's participants, places such as Bristol, Leeds and Sevenoaks were planning to create new groups. Numerous Climate Camp participants did not agree with the financial aspect of CRAGs. It reminded them too much of a market economy where property rights would be assigned to people which they then could trade with others. Other participants were extremely interested in the idea because being part of a CRAG added a practical and constructive element to their campaigning activities.

The launch of the CRAG website in the same year, [www.carbonrationing.org.uk](http://www.carbonrationing.org.uk), further helped the dissemination of the CRAG approach. On the website Andy and the others pointed towards the literature on carbon rationing and posted their short how to guide. The format of the website was quite 'basic': groups and their members could introduce themselves and forums were created to share information. Such a 'homespun format' according to Andy, attracted people and encouraged them to get in touch with other members. Furthermore, it highlighted the informal and open nature of running the CRAGs. No attempts were made to ever constitute the groups or to come up with a collegiate view about topics such as a common amount for penalties or ways to calculate emissions.



From November 2006 to March 2007 groups were established in Wokingham, Leeds, Glasgow, Surrey, Chiswick, Redland (Bristol), Edinburgh, Sevenoaks, and Stroud. Around seventeen were still in the process of being established; two of them were based in businesses rather than a geographical area (one of them WSP Environmental was still active in 2010 and the main organiser had spread the model to other companies). The media became more and more interested in CRAGs (and in the issue of climate change overall). In January 2007, the CRAG idea appeared for the first time in 'The Observer'. At the time, rationing as a policy measure was being considered in depth by the Department of the Environment, and received support from David Miliband (who was at the time the Secretary of State for Environment, Food and Rural Affairs). It was a time when climate change was

During the interview it seemed that at the time Andy was surprised about the Climate Camp's participants' reaction. For him the CRAG concept was the 'obvious' way to take action. It did not alter Andy's determination to keep continuing to pursue the idea. It might have even helped to strengthen his argument for the need to try the CRAG approach... maybe it seemed to opponents that the approach relied upon people being materially motivated by money and therefore struggled with the idea?

I wonder how the CRAG movement would have developed if the first groups had been more systematic about implementing the CRAG concepts (such as applying penalties in every case). Although the approach was well defined in the guide with some clear aims, when applied in the group they were interpreted in a variety of ways.



regularly in the news, and marches, mass rallies and events were organised by environmental groups.

### Institutional infrastructure

Strategic Niche Management theories emphasise the need to develop a systematic institutional infrastructure (e.g. conferences, newsletters, journals and associations) to act as a repository for such lessons generated during innovation processes. The CRAG network created an institutional infrastructure (through organising network meetings and developing a website) to exchange ideas and discuss some of the CRAG concepts. Such efforts, however, were underpinned by rather informal and voluntary processes (also represented in the design of the website) rather than systematic ones. Although the network thought about more systematic ways to spread the CRAG concepts, one has to remember that it has been organised by volunteers whose aim was to grow more organically.

### The height of CRAG movement

#### *First CRAG network meeting*

In February 2007, the first CRAG network meeting took place in Cambridgeshire. About twelve CRAG members turned up, representing eight CRAGs from all over the UK. Between discussions and sharing ideas, the groups helped a local environmental group to plant trees, trying to protect the local area from flooding. According to Andy, it was a very enjoyable and friendly meeting. People were happy to meet each other face-to-face for the first time (although some of them already knew each other from Climate Camps or Stop Climate Chaos marches) and to give each other an idea of how they run their groups. It provided everybody with the chance to deepen some of the conversation that they had started in the CRAG forums, discussing issues such as whether groups should constitute themselves and if they should try to gain some funding as a network. Some were wondering whether they should be a bit more organised in facilitating the network. After the meeting, several of the ideas were taken up in individual CRAGs but the whole network kept on growing organically and informally rather than in a more organised way. Overall, one of the key things the members took away from the meeting was that the CRAG concept had been interpreted into a variety of different approaches, giving relative importance to the different themes: penalties, accountancy and targets.

Rachel Howell, a researcher from the University of Edinburgh, who carried out twenty-three semi-structured interviews with CRAG members from ten different groups between June and August 2008, found the following variations in relation to their carbon target, accountancy and penalty:

#### *Penalty*

In 2008, thirteen out of the twenty-one 'active' CRAGs listed on the website had a financial penalty for going above the agreed carbon target. The amount varied between 2p to 10p per kilogram. In some CRAGs (such as Leeds) members could choose their own penalty whereas in many others there is a cap to the amount members have to pay within a one-year period. Six of the CRAGs decided to have

In relation to other community energy groups, it was interesting to see how relatively easy it was to establish a CRAG. It required no real resources. The groups did not need to constitute themselves legally or gain financial support to get started. One of the main tasks was to gather participants and collect the carbon data.

The CRAG innovation history really revealed to me that groups do not just spread from one location to the next in their whole totality, but often get reinterpreted in each locality. In particular, the CRAG approach has been applied in a variety of different ways. One of the reasons might be that some of its concepts touch upon people's individual lifestyles, which are very personal and often private.

Such diversity has the potential to generate mutually beneficial ideas... creating the opportunity for numerous groups to be set up and learning between them to happen.

no financial penalty to their scheme. The CRAGs that did decide to have a financial penalty needed to agree upon what they would do with the money at the end of the year, whether they regarded it as a carbon tax (giving the money, for example, to environmental charities) or incorporated it into a carbon trading system (giving the money to members who were below the set target, such as was the case in Islington).

#### Accountancy

Most of the groups varied in relation to what carbon emissions they calculated as part of their scheme and how they calculated them. Most groups covered the emissions from heating, electricity, car and plane travel, using agreed upon conversion factors within the group (such as from The COIN Carbon Calculator) or a footprint calculator to account for their emissions. Some groups have included public transport (and many have attempted to include food). The groups adopted a variety of positions about how to account for children (whether to give children an adult or half of an adult allowance) and 'green electricity' (from renewable sources) tariffs. A lot of groups had a 'carbon accountant' who regularly collected all the data for the members but in other groups members just did their own calculations.

#### Carbon targets

Most of the CRAG groups agreed upon a carbon allowance that started with a ten per cent reduction target of the UK average per capita direct emission of 4500kg. One of the CRAGs (Langport) grounded their first year target on the group's average baseline (rather than UK average), which amounted to 8400kg, including a ten per cent reduction each year. Other CRAGs (such as Fownhope) went for a target of ten per cent from each individual member's starting baseline. Other CRAGs allowed members to decide on their own targets (as long it was below their previous one), interpreting the CRAG concepts in a variety of different ways.

#### Spreading the concepts

Innovation theories highlight the wide range of resources and skills required to spread innovations. They also place emphasise on the kinds of rational experimentation and learning processes that innovators often need to go through to ensure that their innovations work across different contexts. At the same time, however, these theories tend to downplay the emotional and social aspects of spreading innovations. The Carbon Rationing Action Group innovation history demonstrates that for some community energy groups, resources are not the most essential part in helping them spread, but rather the development of soft skills, so that groups can create a trustworthy, social and relaxing environment in which CRAG concepts can be explored in everyday life.

Andy: "If someone who's enthusiastic is involved in lots of things, says, "Right, let's start up a CRAG," they're often very good starters, but they're not able to carry it on. They want to pass the CRAG on, then they discover that actually nobody wants to take it off them."

#### Second CRAG network meeting

A year later the CRAG network met up for their second (and final) meeting, which was held on an organic farm in Cambridgeshire. The group was down to six people. Some of the key members did

It seems that community energy groups require people who are visionary, coming up with the original idea of setting up a group and others who help to keep groups going once they have established themselves.

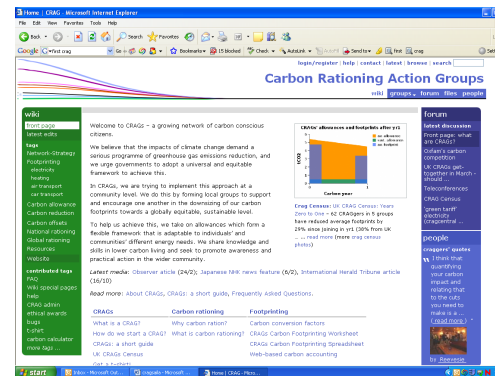
not turn up because they had started up a string of environmental projects (and consequently could give the CRAG less of their time) or moved on to other projects. The meeting had a slightly different feel because the different interpretations of the CRAG concepts became even more apparent than during the first meeting. One of the key differences was the division of CRAGS into rationing or reduction groups. For Andy, 'rationers' are groups who are more concerned about the social justice aspects of CRAGS (and consequently implement penalties and equal targets based on a global baseline), and 'reducers' are groups who were more concerned about reducing their carbon footprint (and consequently were more concerned about reducing their carbon emission and implementing measures that helped them along the way). Some of the Carbon 'Reduction' Action Groups were uncomfortable about the term 'rationing' and its accompanying concepts in particular with the implementation of penalties.

Andy: "There were those who are 'rationers' or 'reducers' - people who argued for one, people argued for the other, but in both, Leamington and Glasgow, we've kept the idea of a budget or a ration that's equal to all."

In addition to the network meetings, discussions between 'rationers' and 'reducers' were greatly recorded on the CRAG website. In the forums members were committed to explore all aspects of the CRAG approach. For instance some pages in the forums included a detailed discussion of how to account for green electricity, with much of the debate pre-empting government moves to clear up the situation for consumers trying to decide between renewable suppliers. There was a wealth of information on the site and numerous links to other websites (such as DECC and the IPCC). Some of the members also discussed ways to publish the CRAG ideas and tried to gain funding to be able to more actively spread the approach (such as from NESTA's Big Green Challenge). Other members did not quite agree with such attempts because they felt that CRAGs should spread organically (by themselves) rather than adapting to fit the agenda's of others.

For Andy during the second meeting it was becoming apparent that 'carbon rationing' was for various reasons not a 'sticky concept'. The concept of stickiness comes from Malcolm Gladwell's book Tipping Point: 'The specific content of a message that renders its impact memorable'.

Maybe the whole point about a community approach is to adapt and develop methodologies meaningful for the communities involved, which suggests some variability and diversity, even if the overall aims are similar.



Andy: "I'm not sure how reliable, you know, the numbers are... each year, we are counting slightly different things. Each group would use a different methodology. So it's very tricky..."

The website helped some of the members (at least the administrators of the group) to keep in touch with each other and share their individual learning from within the groups. For example, this sharing of information allowed members to improve messy, handwritten attempts to calculate their carbon data into a more developed system that was more easy to follow and aggregate when considering the data of more than one group. David, who was mainly responsible for the website, tried at numerous points to gather the data from numerous groups to calculate the overall impact of CRAGs (and demonstrate their potential impact). This was a rather complex task, considering the different CRAG approaches

Considering that the CRAG network had difficulties in calculating their overall impact (an approach that is even based on calculating carbon emissions and thus produces data along the way), it becomes apparent how challenging it is to demonstrate the impact of community energy groups that do not share the same aims and methodologies.



and the ways they decided to calculate their carbon emissions. At one point, he published his calculations on the website (see table below), using data from five CRAGs (Oxford, Hereford, Leamington, Glasgow and Sevenoaks) that submitted figures for group/individual emissions, both for the year before they started the group (see baseline emissions) and for their first carbon year. It was calculated that the members of these groups reduced their average footprint by 32% in their first year (from 5.4t to 3.8t).

In an attempt to live closer to his family and thus reduce his carbon footprint even further, in October 2006, Andy moved to Glasgow after leaving the Leamington CRAG (the West Midlands group stopped meeting six months after Andy left – he reckons that they could not find anybody ‘energetic’ enough to take over the group). Andy was keen on setting up a new group in Glasgow. He sent out a short message on ‘The Green List’ forum, saying ‘an introduction to Carbon Rationing Action Groups - looking for people who are interested in reducing their carbon footprint’ and announcing a meeting place and date. On the day about six people turned up, all interested to hear what this group was about and how they could reduce their footprint. Some of the people had seen each other at other ‘green’ events but nobody really knew each other. As an introduction to the CRAG approach, Andy went through the short guide he had written in 2006. He introduced the group to the C&C concepts, showing them a pie chart of the world’s carbon emissions and then asking them how much the North and South is responsible for these emissions. He wanted to demonstrate to the group that the North needed to seriously reduce their emissions because of climate safety and social justice reasons.

Mayer Hillman’s book also helped him to get some of the CRAG concepts across to the group. Andy tried to give them an idea about how they could run the Glasgow CRAG and what targets/penalties they could decide on, whilst providing some plausible arguments for setting the CRAG up in such a way. At the end of the meeting, Andy explained to everyone how they could calculate their carbon baseline with ‘The COIN Carbon Calculator’ (and handed out a short leaflet that explained it all) so that they could make an informed decision on setting the group’s starting baseline (carbon allowance), target, penalties and trading system during the next meeting. A few weeks later, the group got together for the second time to compare their baseline calculations. Some of the people did not feel like sharing their data with the group and others struggled to produce it, but overall they had enough data to agree upon a starting baseline (4500kg), their first year target (4000kg), and their penalty (4p per kg). They all agreed to send their figures to Andy at regular intervals and meet on a quarterly basis. In addition to some of these short-term aims, the group tried to come up with more long-term goals, considering what reduction targets people such as Mayer Hillman advocated (what needed to be achieved nationally and globally) by 2020 and 2050, and setting their targets in relation to these wider aims.

The first two meetings occurred without any major disagreements about the basic running of the Glasgow CRAG. The only topic that caused a bit of a discussion was whether children of any age should have the full or half of an adult’s carbon allowance. The people without children were in the majority and quite happy for children to have the full allowance: a year later when they all calculated their yearly carbon emissions, the group actually realised the consequences of their decision when most of the families in the group had the lowest footprint. Probably one of the greatest disturbances was caused by an unexpected visitor during the second meeting. He felt that the approach was too

Andy: “...and we’ll give ourselves this budget, and we need to reduce 10% a year or whatever it is and that’ll allow us to look at ourselves in the mirror every morning and say that we’ve been good global citizens.”

Andy: “I suppose the people in the Glasgow group were sufficiently buying into the idea of fair shares that they were happy to go with a single allowance per person.”

Another striking feature is how policy has considered this kind of carbon trading as a general-purpose ‘market mechanism’ approach to incentivising carbon cutting; and yet the CRAG experience suggests its legitimacy rests on how much people trust the other participants to follow the process and enter into the spirit of reducing carbon. Even economic and regulatory measures like this one are deeply sociological.

I was surprised how easy it seemed for the group to agree upon all the aspects of running the CRAG. This might not have been the case for every group.

reductionist, trying to divide the environment into equal shares and therefore legitimising people to 'own' parts of it: this was a rather unacceptable concept to him. Although it was not easy to deal with such an intruder, in retrospect Andy felt that he might have verbalised a lot of concerns others in the group were wondering about, helping them to make up their mind whether they wanted to take part in the CRAG.

These interruptions had no real impact on the development of the group. Most of the members were just really just curious about the process and just wanted to give it a go. All of them had a passion for getting engaged in green issues and had a real interest in reducing their individual carbon footprint. Andy felt that at this stage that discussions 'did not take place on an equal footing', considering that he had engaged with the topic for some years and created arguments for the different decisions that had to be made. Most of the participants believed that Andy had a very democratic way of running the group from the start. They trusted Andy to make appropriate choices for the group and just were curious about the approach.

Kat: "I know lots of people involved in kind of activism and things but I joined it because... I was just starting a masters at the time in economics, sustainable development and I was quite interested in, what would you call them, sort of systems for reducing... and I was interested to see whether using financial incentives would be useful incentive."

Russell: "I identified Andy to be someone I just wanted to talk to... I am a member of Friends of the Earth... and Andy was also involved in that... CRAG deliberate undertaking to reduce your carbon emissions with a target in mind and the carrot and sticks involved in that and that appealed to me."



During the first year ten people made up the Glasgow CRAG: Andy (who set up the group), Russell (who Andy met through the Friends of the Earth group in Glasgow – a 67 year old statistician), Ian (who has his own business), Daryl and Lucy and their children (at the time he was prospective Green Councillor and she was engaged in several environmental groups), and Kat (who had just started her Masters in sustainable development and economics). Most of them were in their thirties, white, well-educated and interested in environmental issues but varied in their family status and income levels. Comparing the socio-demographics of the Glasgow group members with Rachel Howell's research on CRAGs, they could be described as quite a typical group. In her research she found that most of the CRAG members could be classified as 'positive greens' (based on DEFRA's segmentation model), which make up eighteen per cent of the UK population and show the most positive pro-environmental beliefs, behaviours and attitudes in relation to the population as a whole. The Glasgow CRAG had a

few meetings at the beginning to get started and then met up every quarter to hand in their data to Andy.

*One/two years onwards*

In March 2008, the group met up for the first 'settlement meeting'. After calculating the first year's data, they realised that they had set the allowance rather high with 4500kg because most of the members were able to stay on target. The transfer of penalty funds amounted to a drink in the pub. At the end of year one, Lucy and her family had the smallest carbon footprint of about 1500kg. The family (including the children) were extremely eco-friendly. They lived in a tenement in the centre of Glasgow, cycled everywhere and chose not to fly. It also helped that the two children received an adult carbon allowance. Other members were able to cut two thirds of their carbon footprint. Kat, for example, achieved this by being frugal with the heating (wrapping up in warm blankets), installing extra insulation in the loft, buying an electricity monitor (to be able to check where the highest consumption arose), selling the family car and visiting her husband's family in Europe by train. She wrote about the difficulty of trying to gain cheap train tickets to visit her parents-in-law in Switzerland in her blog entry from 18.12.2011 (<http://katkin.posterous.com>):

Andy: "... which also is interesting in itself because, you know, is this all the penalty that we're asking ourselves to pay is enough for a drink at the pub."

"The problem lies in the booking: the complex, time-consuming system, where prices are highly time-sensitive and each journey has its own booking horizon. October has become, for me, that dreaded season when the nights start drawing in, the clocks go back, and I have to start the monumental task of booking our Christmas trip to the Grandparents [to Switzerland]. It starts with researching and carefully inscribing in my diary probable release dates for each of the six tickets. The first date to come round is for Eurostar, with a booking horizon of 120 days. I have never managed to get this early enough to get the best prices, but the past two years I have received free tickets in return for putting up with variously horrific Christmas travelling experiences, well covered by a gleeful media (2009: trains stuck in tunnels, 2010: queues and cancellations). Despite the past nightmare journeys, people seemed keen to subject themselves to more of the same, as all the cheap tickets have already gone. The return journey for only the London-Paris section would be more than £400. I checked the TGV tickets and the sleeper: both were unavailable, but there was good news. I could still get the cheapest TGV tickets for the outward journey: I would just have to log on at 5am on the release date. Experiences from previous years have taught me that this release of tickets inevitably happens when we are on a half term holiday far from internet connectivity. Two autumn breaks running have seen me crouched self-consciously outside a hotel and rental cottage respectively, suspiciously accessing unsecured wireless in the pitch dark. One of those times, I had mistakenly tried to buy the tickets at midnight (on a dark picnic bench in the rain), eventually discovering the release was 5am, and returning to the picnic bench hours before dawn.

The prize, if you are successful, are tickets for the three and a half hour, high speed journey for just over £30, and the privilege of going through the process a week or so later for the return journey. The sleeper is a vital part of our travel strategy, allowing us the illusion that our travel time really only starts when we slide out of our tightly tucked berths, chewing on a shortbread biscuit, and wander dazed into the bustle of Euston station. There are some amazing deals if you can find them. A berth of the cheapest advance fare with a friends and family railcard costs £35.30 for adults and only £10.15 for children. Good luck with getting one though, if you are travelling with kids you cannot buy sleeper tickets online. You need to call the booking line at the moment of release, panic rising through the holding muzak, as you wait to find out if have won those few golden tickets. The stakes are high, after the first tranche of tickets; the price rises to £269 each way for the family. For our most recent Swiss trip, I had the deflating experience of missing out on the cheap tickets for both the outward, and return journeys. Of course, at this point I was committed to a date, set at the

I was impressed by the amount of effort Kat put into changing her lifestyle, trying to reduce her carbon footprint, but also the challenges she came across in attempting to do so. Although the group was helpful in supporting each other's efforts, the journey of reducing the carbon footprint was quite an individual process (such as finding a cheap train ticket to get to Switzerland).

point I bought the Eurostar tickets. If this is not making the booking of European train travel an attractive proposition, that is because it isn't, unless you are prepared to pay serious money. Through tickets are available from London to many destinations in Europe, but these cost more because, by the time the TGV tickets become available, only the expensive Eurostar tickets are left. Comparing booking the train, at a cost of between £776 and over £2000 for the family, and taking many hours, over a period of a couple of months, with the plane booking process is highly unfavourable. With only a few clicks, a return trip to Basel with luggage can be bought for £352. So, it figures that I would have to be an angel or a serious masochist, to go ahead with the train booking... And that is what I am going to do."

Sunny: "Peer pressure. Well, I guess... there's some of that, I mean I guess if you, if you came to the group and you had like flown half-way round the world and sort of a 6 tonne carbon footprint that year or whatever, it just would have been like "What are you even doing here?"

Andy: "By the end of the first year we were getting a really good feel for basically, the people with small footprints, it's things they didn't do, right, that had made them have small footprints."

Kat: "So at the beginning we got rid of the car... we started to travel by train so we didn't take any flights... but then I started commuting to Edinburgh by train and that was really big... I don't think it's very accurate because the thing is once you get down to very low level then it really matters what your index is. So lets say I take the train to Edinburgh every day... you could argue that because you're a commuter and you're packed in like cattle transport it's a much lower footprint than if you're travelling on an average train... you kind of start getting picky."

During the first years, the structure of the CRAG proved to be a fantastic 'support group' for its members. For its members it was reassuring to find some like-minded people who shared similar ambitions. A form of peer pressure also existed within the group. If members had increased their carbon footprint by the end of the year, the others might wonder why they are actually part of the group. Moreover, the group provided inspirations for members with larger footprints to see what lifestyles with smaller ones actually look like in daily life. Some of the members liked that the aims of the CRAG, which seemed to be rather 'radical' at the beginning, and could potentially make a real difference to climate change if some of its principles had been applied nationally or even globally. Because of the first year success, Andy could easily persuaded the group to set the next year's target to 4000kg with a higher penalty for over-emitters.

When it came to the second 'settlement meeting' in 2009, the group realised that they had far more money in their carbon fund than at the end of the first year (although most of them kept reducing their carbon emissions). One person stopped coming after this meeting, not wanting to pay for the penalty. When it came to the point to agree on next year's penalty and activities that would be counted into the carbon footprint, some more 'tricky' deliberations started to emerge. For example, in the second year, Sunny joined the Glasgow CRAG; she had to take long-haul flights for work several times a year. She works for a charity that tries to prevent the spread of rabies across the world. In her case the CRAG members decided that business trips need not to be counted because individuals have no real autonomy over where they needed to go for work (and in Sunny's case her work was considered to bring a lot of non-carbon benefits).

A debate about the distinction between business and leisure travel started one of the members wondering whether his gas and electricity home usage should be considered as a whole, considering that he was working from home and consequently used more gas and electricity than a member who went to work on a daily basis. The group realised that it had become more difficult to 'draw the line' on what should or should not be counted in relation to what was considered 'fair' for everyone. The more they reduced their footprint the more these small details became important. All of them had lived through two 'carbon counting years' and therefore realised how the different rules would impact on their individual carbon allowance. For Andy such debates rather distracted from the real issue of climate change and the reduction that needed to occur. For him, the social justice aspect of C&C was crucial to consider within the development of a CRAG. He was sometimes discouraged by the debates where the group tried to set the next target because, for him, the first baseline should have been set according to the average global baseline (which is lower) rather than the UK one. Such a baseline would have been important to reach Monbiot's ninety per cent CO2 reduction target by 2030.

It was interesting to see how the group tried to apply global and national concepts on a local/ micro level. Although for all the members the global relevance was important at the beginning, once they tried to apply the concepts into their day-to-day life it was difficult to hold onto the wider picture. Smaller details of reducing the carbon emissions started to play more of a key role.

There was a slight split in the CRAG group between people who felt it was motivating to set achievable targets and the ones who felt that the targets needed to be globally relevant.

After realising that they had more money in their carbon fund at the end of the second year, another key topic up for debate was the division of these funds. Although the group decided during their second meeting that the over-emitters would need to pass the fund to the under-emitters, when it came to the exchange of funds the under-emitters felt awkward about taking the money. Some of the members argued that they wanted to take part in the CRAG because of 'altruistic' reasons and felt that the exchange of funds was rather demotivating, whereas some of the others regarded the transfer of funds as a key part of the CRAG concept. A long discussion over what should happen to the money then took place. One option was to hand it back to the over-emitters so that they invest money in making their home more energy efficient. In the end, they decided to give the money to charity but debated about whether the under-emitters or over-emitters should decide to which charity the money should go.

Andy: "I suppose that one of the problems with the fair share principle is that there always going to be exceptions... what about the person living in the middle of nowhere in a draughty house, surely they're going to need a bigger travel budget and a bigger heating budget than somebody living in a nice well-insulated housing association flat in the middle of the city... you're trying to apply an abstract principle to real life situations and some people immediately say "No, we've got to adjust the principle and make a compromise", other people will hold on to the abstract principle for longer..."

Andy: "I actually thought that the penalty would actually affect people's behaviour. But I don't think it ever has, so it failed in that sense. The incentives that are bound up in the compensation scheme, is bound up in domestic trading quotes and C&C have completely failed to work at our level."

### Experimenting with 'sticky' concepts in everyday life

Strategic Niche Management theories emphasise the importance of experimenting and 'learning-by-doing' in generating successful innovations. CRAGs were often considered as being experimentations of personal carbon allowance schemes in everyday life. However, most of the CRAGs had to realise that it was not easy to incorporate the knowledge that they gained from implementing the concepts into their daily life whilst at the same time hold onto the overall visions and aims of the CRAG (such as the need to implement penalties). The CRAG concepts seemed to have been built on a narrowly framed structure, which was difficult to amend without losing its overall purpose. This innovation history demonstrates how challenging it can be to apply abstract ideas into everyday life, and the importance of being able to amend early concepts to develop the overall approach so that it can be applied more widely.

Over time CRAG members have found it harder and harder to cut their emissions, as those that individuals have control over 'dry up', leaving only emissions whose reduction requires decision by others (such as investments in low carbon infrastructures, or regulations for the construction of houses). CRAGs might have found limits of individualised behavioural approaches that are of interest to policymakers working in this area.

### Being approached by other groups

Since the beginning, most of the Glasgow CRAG members have been actively involved in other environmental groups whilst taking part in the CRAG (such as Friends of the Earth, Transition Town and Campaign Against Climate Change). Kat got engaged in the Eco Congregations years ago, developing climate change modules for bible studies whilst including CRAG ideas (since then Kat has published the material on her blog). Once Andy even came along to talk with Kat's congregation about the CRAG ideas in the hope that they would create a similar group as part of the church. Similarly, Transition Town groups got in touch with Andy (mainly through the CRAG website) to

I was surprised to hear that the CRAG model was not really taken up by the other environmental groups with which the Glasgow CRAG members were associated. There must be something about the approach that speaks to some environmentalists but not to others.



explain to them how to set up a CRAG group. These engagements with other groups have been short and brief. Andy is unsure how many (if any) groups have taken up the model.

Although Andy was actively involved in the CRAG network, the overall Glasgow CRAG was mainly engaged in local environmental activities. As a group, they organised Stop Climate Chaos marches in Glasgow, in particular when the Scottish government was discussing the content of the Climate Change Act. In July 2008, the Glasgow CRAG group got involved in Holyrood 350, which is a grouping of environmental groups in Scotland (including groups such as PEDAL, the Isle of Eigg and Going Carbon Neutral Stirling). The grouping was interested in influencing the Scottish Climate Change policy, campaigning greatly by organising events and responding to consultations. Part of the campaign was the implementation of the C&C model in Scotland. FEASTA (an environmental think tank from Ireland) helped the grouping to communicate some of the C&C concepts. Some of the Glasgow CRAG members enjoyed being part of the Glasgow (Scottish) environmental scene and hearing about what was going on. During events they sometimes met people who they invited back to CRAG meetings to inform themselves about different topics such as how to count the carbon of food.



#### *Keep counting*

In addition to food, public transport was a topic that the Glasgow CRAG wanted to include more and more into the counting system. After the second year, the group decided to incorporate public transport (not just trains but also buses), starting off with trips outside Glasgow and then after some time including the public transport within Glasgow. This decision increased the complexity and amount of work devoted to gathering the data but got them one step closer to calculating most of their individual carbon emissions. The gathering of data was more enjoyable and easier for some members than others. Some came up with little tricks (such as leaving sheets of paper at the door to record their data each time they entered the house) to make the counting more undemanding. Every quarter, they all sent the raw data to Andy, who converted them all and calculated each member's final year carbon footprint.

Over the last six years some of the members have managed to steadily reduce their footprint. For example, Ian, who has his own business, started off with one of the higher footprints within the group but through changing his lifestyle and modifying his home has been able to keep reducing his carbon output. For most of the others the decrease was not a constant and linear process but was more of an up and down journey. Andy could reduce his footprint because he moved to Glasgow and lived in a flat share, cutting down on his travel and heating. He also stopped flying, which had a massive impact on his footprint, and started working three instead of five days a week to have lower earnings and therefore fewer possibilities to do carbon intensive activities. But against 'all CRAG principles', more recently Andy moved out of the city into a one bedroom 1850s flat which is extremely draughty and consequently increased the amount energy he needs to heat his home (and consequently his overall carbon emissions).



However, if the group re-evaluates its aims the core concept of the CRAG would also need to be re-thought (such as the global social justice aspect) which got some members thought might anyway be the end of the CRAG.

Similarly, Kat experienced more of an up and down journey over the years, full of deep reductions in the first year but also carbon 'sins' during the following years. She wrote about her experience in her blog entry on 15.12.2012 (<http://katkin.posterous.com>):

"Each January for the past 6 years I have calculated the greenhouse warming potential of my own activities and shared them with my CRAG, a kind of woolly-jumper-wearing, allotment-cultivating, bike-riding Alcoholics Anonymous. 'Hello, my name is Kat and I emit carbon'. The incentive to reduce emissions is not just shame, but the fact that fines are imposed on those who do not comply. This year, I am particularly worried about my figures, the past few years I have been doing really well in bringing down my emissions. I reduced my plane use and then ceased flying altogether, I got rid of the car in favour of dragging two small children round Glasgow on foot and waiting interminably at bus stops, and I managed to get by with an even colder house than I had ever had before (and that is saying something!). However, this year I have committed a number of high-profile carbon sins: among them buying a car after 6 years without, and using an aeroplane for the first time in four years. Not once, mind you, but twice. However some things go in my favour: during 2011 I reduced my commute to Edinburgh from twice a week to once, and I now work wholly from Glasgow, and we finally managed to get the solar hot-water/woodburning stove combo working to a satisfactory extent. I am relatively abstemious when it comes to home energy; arctic-issue

The CRAG model relies on its members to make continuing cuts within their carbon emissions through lifestyle changes, although lifestyles change over time and partly depend on structures that are difficult to alter by individuals. After a few years the members struggled to cut their carbon emissions even further, and consequently the group comes to a 'natural' end unless they re-evaluate their aims.

slippers, thermals plus Norwegian pullover and sleeping under three duvets are de rigor, rather than nuclear winter survival drill. So how did I do on my Carbon Footprint for 2011? This week the bean-counter sent my results back and it gives me great pleasure to share them with you. My 2011 total at 2.45 tons is less than half of the average UK carbon footprint for direct emissions (i.e. energy and transport emissions). It is only slightly higher than last year. My footprint has remained stubbornly stable since the first year I was in the CRAG when I reduced my footprint by two-thirds. The message here is that early deep cuts are possible, but reductions after all the low-hanging fruit have been plucked, are harder. Our group target is on a trajectory for an 80% cut and the target this year was a challenging 1.4 tons, less than a quarter of the average UK footprint for direct emissions. So does the fine act as an incentive? My fine this year will be around £50, and given that I saved over £400 taking the plane to Switzerland rather than the train..."

#### Reaching the bottom and becoming friends

After years of reducing their footprints, most of the Glasgow CRAG members felt that they reached the bottom of what is possible to decrease. During the first years, they had plenty to talk about, comparing their houses, lifestyles and ways of travelling in order to find strategies to implement even more changes. Nevertheless, after making the obvious changes (such as the avoidance of plane travel) these comparisons were much more difficult to make, considering that it had become more difficult to reduce the carbon footprint. During a CRAG meeting where everybody was 'huddling around the heater'; they reflected upon the fact that they might have distanced themselves too much from the mainstream. For some of them, life had become rather 'grim'. Although at the beginning they came up with creative alternatives, after six years holiday options had become thin and they lived in even colder homes.

Reaching such a low carbon footprint and trying to reduce it even further, they realised that they needed to overcome numerous infrastructural challenges (such as a badly insulated flat complex or irregularly run local buses), which were extremely demotivating. Some of the members felt that the CRAG model could not last more than about five years unless it changed the terms of its aims. Still, even up to this point they enjoyed going to the meetings. Over the years, most of the Glasgow CRAG members have grown to be close friends, which also changed the atmosphere during the meetings. They have become much more relaxed as the counting of carbon has become much more of a secondary role. Some of the members also appreciated the time that Andy was putting into gaining the data from everyone, calculating their carbon footprint and preparing the meetings. But overall they just enjoyed the 'natter'.

#### Not a policy tool

The CRAG innovation history demonstrates that efforts coming from community energy groups need to be supported by wider structural changes (implemented, for example, by policymakers). Their efforts cannot be purely considered as a policy tool to engage the public into sustainable energy issues. Groups come across structural barriers that cannot entirely be overcome by the groups' willingness to make a difference. They need to develop in a supportive and protective environment to make a real difference.

#### The demise of the CRAGs: Longevity of the approach?

Andy: "I remember one Crag meeting that everybody was huddling around the heater... realising that there's something wrong here... maybe we've gone too far, from the mainstream perspective."

Kat: "I got to the stage where I almost started to resent it, you know, sometimes I felt it was a good thing to do and I felt like I think this is good for our family because we go to places on the bus and we can sit and chat and it's much better than having the kids buckled up in the back in their car seats or we go on the train or whatever but it started to become a massive pain in the backside because the buses became more unreliable."

For Kat the innovation history 'describes well the process of a group getting pretty much as low as it can due to the constraints of our high carbon infrastructure, etc... At this point if reductions keep going... you either have a recipe for un-motivation, or a carbon offset scheme'.

For Kat the innovation history does not give enough credit to Andy's motivation and commitment, ensuring that the group is still continuing. According to her, he puts a lot of effort in keeping the CRAG going. For her this is the only reason they did not fold two years ago.

The social aspect of community energy groups seems to be key for the survival of these groups... which could be considered as a positive community development outcome – and potentially an important one too – since it is out of these kinds of networks that new innovations might flourish. Narrow instrumental goals are important, but the capabilities to be innovative in other, unknown ways in the future are also cultivated through these projects.



Andy: "Most of the forum posts were from people who were either not members of groups who were just putting in ideas or they were contributions by the admins of the local groups. I don't think there was ever a great input to the website from members of local groups who were not running the local group."

Andy: "So whether you view it as a reduction or as a rationing, they're both constrictive... you know, putting constraints on people's behaviours, whereas transition is all about, you know, rediscovering the benefits of simpler living."

Andy: "I'd be more interested in pushing a kind of an institutionally more acceptable version of C&C... I don't know how much enthusiasm and energy have I got to do that? I don't know, probably not very much at the moment, I seem to have a lot of time for sailing and not a lot of time for environmental activism. So yeah, but I think my involvement on a personal lifestyle level will continue until other influences overtake... your passions rise and fall for various causes and various people..."

Similar to the Glasgow group, some of the other CRAGs struggled to keep the concepts going over time in their locality. From 2006 to 2009 there was a lot of interest in the CRAGs. They peaked at about 25 groups with about two hundred members. The attention plateaued until it finally fell off in 2010. Andy has argued that the momentum in the CRAGs followed a similar trajectory as the governmental and societal interest in climate change – first peaking and then suddenly dropping off. In particular, the website gained a lot of spikes of interest during this time. Whenever there was an article about CRAGs in the news, Andy and David could register a sudden spike of interest in the website (recognised through the amount of registrations and hits on the website). Nowadays, Andy is more suspicious about such peaks of attentions: according to him they rarely translated into long-term members. Only a few members were actively involved in the website and came to network meetings. Overall, rather than spikes and a sudden growth, the CRAGs were growing at a fairly steady rate, never reaching a three digit number.

Since 2010, the CRAG groups struggled to stay alive. Their members became carbon literate and reduced their emissions as much as they could, and consequently, because they could not decrease it any further, were grappling to keep the group going. The CRAG model made the progression of groups very difficult (at least for most groups). It was difficult for a lot of groups to gain more members, as they would have needed to start with a rather low target to begin with. For other groups, it was difficult to keep their members for the long run, as they did not like the idea of being charged if they were over the target and left the group. Sometimes people who were keeping the group together (so called 'leaders' or 'administrators') left the group because they moved on to other projects or their life changed, and consequently the groups fell apart after a while because nobody was holding them together. Most CRAGs that are still in existence now have a low profile trying to find participants locally, making them quite 'invisible'.

Andy reckons that quite a few members left for other groups (such as Carbon Conversations and Transition Towns) since 2008. Some of the CRAG members felt 'oppressed' by the austerity message proposed by the CRAGs and had done the Carbon Conversation training when they were in the CRAG group. The Carbon Conversation and Transition Town approach has been built on a more positive outlook. Members just feel more motivated (and for longer). The CRAG concept is more limiting and structured around reducing the people's emissions, whereas the Transition Town approach allows people to explore what they are interested in and take action. Since the summer of 2012 even the CRAG website has shut down because there was nobody to administer it. The future of the CRAG movement is uncertain. Some might say that it is dead in the UK, but in some countries (such as Australia and the US) CRAGs are still going and are very much alive, and in others they are just starting up.

Nowadays, Andy is much more relaxed about the future of the CRAG movement: it was always meant to spread organically rather than systematically. He no longer tries to 'hoover up' every book about the topic (mainly to keep sane), and currently has no inclination to set up another environmental group. His experience of CRAGs has demonstrated to Andy that the concepts are too difficult to incorporate into people's everyday life for long periods of time. Since reading about the C&C approach, Andy has looked at other carbon reduction ideas and realised that the C&C approach is one of many frameworks. Brendan, a fellow Glasgow CRAG member, introduced Andy to FEASTA's 'Cap and Share' idea, which sounded potentially more successful to him. Such an approach would set

It seems to me that some environmental groups are 'indirectly' in competition with each other or that there are trends between the different messages they convey. The flexibility of these messages and aims seems to be key to gain members and for the survival of a movement.

a national or international cap on greenhouse gas emissions, auction off the allowances to emitters, and then distribute the dividends to individuals on an equal per capita basis. Andy believes that an international or national 'Cap and Share' approach would more quickly converge than a CRAG approach (personal carbon allowance approach).

### **Visioning and mainstreaming**

Much innovation theory emphasises the significance of clear 'visions' that allow a wide range of stakeholders to buy into and support the innovation in question by setting out clear 'expectations for what it is likely to deliver. It might be possible to suggest that CRAGs were built on a very well defined framework (such as C&C concepts) with some clear visions (such as social justice around climate change). However, these did not stand the test of time or reach a broad audience. This innovation history highlights the importance of experimenting with approaches to develop visions that are flexible enough that a range of stakeholders buy into them for long periods of time. The flexibility of visions still seems to be key for community energy groups, considering that the support of these groups is inconsistent. Currently, they need to adapt to the context in which they exist (to gain members and keep them over time) and consequently, broad and flexible messages seems to be key (at least at the beginning).